

## SEQUENCE LISTING

<110> Kenneth Chien, Wolfgang Dillman, Susumu Minamisawa, Huaping He, Masahiko Hoshijima, Markus Meyer, Christopher Scott, Yibin Wang, Gregg Silverman

<120> A METHOD FOR INHIBITION OF PHOSPHOLAMBAN ACTIVITY FOR THE TREATMENT OF CARDIAC DISEASE AND HEART FAILURE

<130> 6627-9025

<140> unknown

<141> November 2, 1999

<150> US 60/106,718

<151> November 2, 1998

<160> 9

<170> Word Perfect 8.1

<210> 1

<211> 52

<212> PRT

<213> Human Phospholamban

<220> wild type

<221> amino acid sequence

<222> 1...52

<400> 1

Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala Ser Thr Ile

1

5

10

15

Glu Met Pro Gln Gln Ala Arg Gln Lys Leu Gln Asn Leu Phe Ile Asn Phe

20

25

30

35

Cys Leu Ile Leu Ile Cys Leu Leu Leu Ile Cys Ile Ile Val Met Leu Leu 52

40

45

50

<210> 2

<211> 52

<212> PRT

<213> Human Phospholamban

<220> Val49Ala mutant

<221> amino acid sequence

<222> 1...52

<400> 2  
 Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala Ser Thr Ile  
 1 5 10 15  
  
 Glu Met Pro Gln Gln Ala Arg Gln Lys Leu Gln Asn Leu Phe Ile Asn Phe Cys  
 20 25 30 35  
  
 Leu Ile Leu Ile Cys Leu Leu Ile Cys Ile Ile Ala Met Leu Leu 52  
 40 45 50

<210> 3  
 <211> 52  
 <212> PRT  
 <213> Human Phospholamban

<220> Glu2Ala mutant  
 <221> amino acid sequence  
 <222> 1...52

<400> 3  
 Met Ala Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala Ser Thr Ile  
 1 5 10 15

Glu Met Pro Gln Gln Ala Arg Gln Lys Leu Gln Asn Leu Phe Ile Asn Phe Cys  
 20 25 30 35

Leu Ile Leu Ile Cys Leu Leu Ile Cys Ile Ile Val Met Leu Leu 52  
 40 45 50

<210> 4  
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 <212> PRT  
 <213> Human Phospholamban

<220> Arg14Glu mutant  
 <221> amino acid sequence  
 <222> 1...52

<400> 4  
 Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Glu Ala Ser Thr Ile  
 1 5 10 15

Glu Met Pro Gln Gln Ala Arg Gln Lys Leu Gln Asn Leu Phe Ile Asn Phe Cys  
 20 25 30 35

Leu Ile Leu Ile Cys Leu Leu Leu Ile Cys Ile Ile Val Met Leu Leu 52  
 40 45 50

<210> 5  
 <211> 52  
 <212> PRT  
 <213> Human Phospholamban

<220> Ser16Asn mutant  
 <221> amino acid sequence  
 <222> 1...52

<400> 5  
 Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala Asn Thr Ile  
 1 5 10 15

Glu Met Pro Gln Gln Ala Arg Gln Lys Leu Gln Asn Leu Phe Ile Asn Phe Cys  
 20 25 30 35

Leu Ile Leu Ile Cys Leu Leu Leu Ile Cys Ile Ile Val Met Leu Leu 52  
 40 45 50

<210> 6  
 <211> 52  
 <212> PRT  
 <213> Human Phospholamban

<220> Lys3Glu/Arg15Glu mutant  
 <221> amino acid sequence  
 <222> 1...52

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 Met Glu Glu Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Glu Ala Ser Thr Ile  
 1 5 10 15

Glu Met Pro Gln Gln Ala Arg Gln Lys Leu Gln Asn Leu Phe Ile Asn Phe Cys  
 20 25 30 35

Leu Ile Leu Ile Cys Leu Leu Leu Ile Cys Ile Ile Val Met Leu Leu 52  
 40 45 50

<210> 7  
 <211> 16  
 <212> PRT  
 <213> Drosophila

<220> antennapedia  
 <221> amino acid sequence  
 <222> 1...16

<400> 7

Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys Trp Lys Lys  
 1 5 10 15

<210> 8  
 <211> 16  
 <212> PRT  
 <213> Human Phospholamban

<220> carboxy terminal  
 <221> amino acid sequence  
 <222> 1...16

<400> 8

Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala Ser  
 1 5 10 15

<210> 9  
 <211> 269  
 <212> PRT  
 <213> Contractilin

<220>  
 <221> amino acid sequence  
 <222> 1...269

<400> 9

Met His His His His His Val Ala Gln Ala Ala Leu Thr His Ser Ser Ser  
 1 5 10 15

Val Ser Ala Asn Pro Gly Glu Thr Val Lys Ile Thr Cys Ser Gly Gly Asn  
 20 25 30 35

Tyr Ala Gly Ser Tyr Tyr Gly Trp Phe Gln Gln Lys Ser Pro Gly Ser Ala

40

45

50

Pro Val Thr Val Ile Tyr Ser Asn Asp Gln Arg Pro Ser Asn Ile Pro Ser Arg  
55 60 65 70

Phe Ser Gly Ser Thr Ser Gly Ser Thr Ser Thr Leu Thr Ile Thr Gly Val Arg  
75 80 85 90

Ala Glu Asp Glu Ala Val Tyr Phe Cys Gly Ser Asn Ser Gly Thr Gly Tyr Val  
95 100 105

Gly Ile Phe Gly Ala Gly Thr Thr Leu Thr Val Leu Gly Gln Ser Ser Arg Ser  
110 115 120 125

Ser Thr Val Thr Leu Asp Glu Ser Gly Gly Leu Gln Thr Pro Gly Gly Ala  
130 135 140

Leu Ser Leu Val Cys Arg Ala Ser Gly Phe Thr Phe Ser Arg Phe His Met  
145 150 155 160

Met Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Gly Ile Asp  
165 170 175

Asp Gly Gly Ser Phe Thr Leu Tyr Gly Ala Ala Val Lys Gly Arg Ala Thr Ile  
180 185 190 195

Leu Arg Asp Asn Gly Gln Ser Thr Val Arg Leu Gln Leu Asp Asn Leu Arg  
200 205 210

Pro Glu Asp Thr Ala Thr Tyr Phe Cys Val Lys Thr Lys Cys Gly Gly Asn  
215 220 225 230

Gly Trp Cys Gly Ala Asp Arg Ile Asp Ala Trp Gly His Gly Thr Glu Val Ile  
235 240 245

Val Ser Ser Thr Ser Gly Gln Ala Gly Gln Tyr Pro Tyr Asp Val Pro Asp Tyr  
250 255 260 265

Ala Ser  
269

<210> 10  
<211> 36  
<212> PRT  
<213> Human Phospholamban

<220> PLB-ANT  
<221> amino acid sequence  
<222> 1...36

<400> 10  
Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala Ser Thr Ile  
1 5 10 15

Glu Met Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys Trp Lys Lys  
20 25 30 35

<210> 11  
<211> 35  
<212> PRT  
<213> Human Phospholamban

<220> TAT-PLB  
<221> amino acid sequence  
<222> 1...35

<400> 11

Gly Gly Gly Gly Tyr Gly Arg Lys Lys Arg Arg Gln Arg Arg Arg Met Glu  
1 5 10 15

Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala Ser Thr Ile Glu Met  
20 25 30 35

<210> 12  
<211> 36  
<212> PRT  
<213> Human Phospholamban

<220> Ser16Glu PLB mutant-ANT  
<221> amino acid sequence  
<222> 1...36

<400> 12

Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala Glu Thr Ile  
 1 5 10 15

Glu Met Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys Trp Lys Lys  
 20 25 30 35

<210> 13  
 <211> 35  
 <212> PRT  
 <213> Human Phospholamban

<220> TAT- Ser31Glu PLB mutant  
 <221> amino acid sequence  
 <222> 1...35

<400> 13  
 Gly Gly Gly Gly Tyr Gly Arg Lys Lys Arg Arg Gln Arg Arg Arg Met Glu  
 1 5 10 15

Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala Glu Thr Ile Glu Met  
 20 25 30

<210> 14  
 <211> 16  
 <212> PRT  
 <213> Drosophila

<220> ANT  
 <221> amino acid sequence  
 <222> 1...16

<400> 14  
 Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys Trp Lys Lys  
 1 5 10 15

<210> 15  
 <211> 11  
 <212> PRT  
 <213> HIV

<220> TAT  
 <221> amino acid sequence  
 <222> 1...11

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<400> 15  
 Tyr Gly Arg Lys Lys Arg Arg Gln Arg Arg Arg  
 1 5 10

<210> 16  
 <211> 61  
 <212> PRT  
 <213> E. coli

<220> H6-ANT  
 <221> amino acid sequence  
 <222> 1...61

<400> 16  
 Met Arg Gly Ser His His His His His Gly Met Ala Ser Met  
 1 5 10 15

Thr Gly Gly Gln Gln Met Gly Arg Asp Leu Tyr Asp Asp Asp Asp  
 20 25 30

Lys Asp Pro Ser Ser Arg Ser Ala Ala Gly Thr Met Glu Phe Arg  
 35 40 45

Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys Trp Lys Lys  
 50 55 60

Ala  
 61

<210> 17  
 <211> 79  
 <212> PRT  
 <213> E. coli

<220> H6-wtPLB-ANT  
 <221> amino acid sequence  
 <222> 1...79

<400> 17  
 Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala  
 1 5 10 15

Ser Thr Ile Glu Met Pro Gln Gln Ala Arg Gln Lys Leu Gln Asn  
 20 25 30

Leu Phe Ile Asn Phe Cys Leu Ile Leu Ile Cys Leu Leu Leu Ile  
35 40 45

Cys Ile Ile Val Met Leu Leu His His His His His His Lys Gly  
50 55 60

Glu Phe Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys  
65 70 75

Trp Lys Lys Ala  
79

<210> 18

<211> 79

<212> PRT

<213> E. coli

<220> H6-PLB (Ser16Glu mutant)-ANT

<221> amino acid sequence

<222> 1...79

<400> 18

Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala  
1 5 10 15

Glu Thr Ile Glu Met Pro Gln Gln Ala Arg Gln Lys Leu Gln Asn  
20 25 30

Leu Phe Ile Asn Phe Cys Leu Ile Leu Ile Cys Leu Leu Leu Ile  
35 40 45

Cys Ile Ile Val Met Leu Leu His His His His His Lys Gly  
50 55 60

Glu Phe Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys  
65 70 75

Trp Lys Lys Ala  
79

<210> 19

<211> 79  
<212> PRT  
<213> E. coli

<220> H6-PLB (Val49Ala mutant)-ANT  
<221> amino acid sequence  
<222> 1...79

<400> 19  
Met Glu Lys Val Gln Tyr Leu Thr Arg Ser Ala Ile Arg Arg Ala  
1 5 10 15

Ser Thr Ile Glu Met Pro Gln Gln Ala Arg Gln Lys Leu Gln Asn  
20 25 30

Leu Phe Ile Asn Phe Cys Leu Ile Leu Ile Cys Leu Leu Leu Ile  
35 40 45

Cys Ile Ile Ala Met Leu Leu His His His His His Lys Gly  
50 55 60

Glu Phe Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys  
65 70 75

Trp Lys Lys Ala  
79